



Installation Guide for the 9 dBi Omni-directional Antenna ANT2409

NETGEAR

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Federal Communications Commission (FCC) Compliance Notice: Radio Frequency Notice

In the U.S., the ANT2409 antenna should only be used with devices that have been FCC approved for use with it. Please check the NETGEAR web site at http://www.NETGEAR.com/go/antannas_fcc for an updated list of FCC approved devices.

European Emission Statement

For EU, use of any antenna requires careful planning and extra consideration to comply with EU emissions, health standards and regulations. It is recommended that a qualified professional installer service is consulted for site survey and proper installation. Antenna installation must comply with the maximum level authorized by each country. See http://www.NETGEAR.com/go/antannas_eu for product combinations that comply with EU regulations.

Contents

Chapter 1

Getting Started

Package Contents	1-1
Pole Mounting Configuration	1-3
Flat Surface Mounting Configuration	1-4
Placement and Other Important Considerations	1-4

Chapter 2

Installing the Wireless Antenna

First, Assemble and Mount the Antenna	2-1
Now, Connect the Antenna	2-4
Connecting the Antenna for an Outdoor Installation	2-4
Connecting the Antenna for an Indoor Installation	2-5

Chapter 3

Specifications

Wireless Antenna and Mounting Assembly	3-1
2 Meter Antenna Cable	3-2
N/SMA Adaptor Accessory	3-3
Lightning Arrestor Specifications	3-4
Radiation Patterns	3-5

Chapter 1 Getting Started

Thank you for purchasing the NETGEAR 9 dBi Omni-directional Antenna. This Installation Guide provides installation instructions and guidelines for using the wireless antenna.

Package Contents

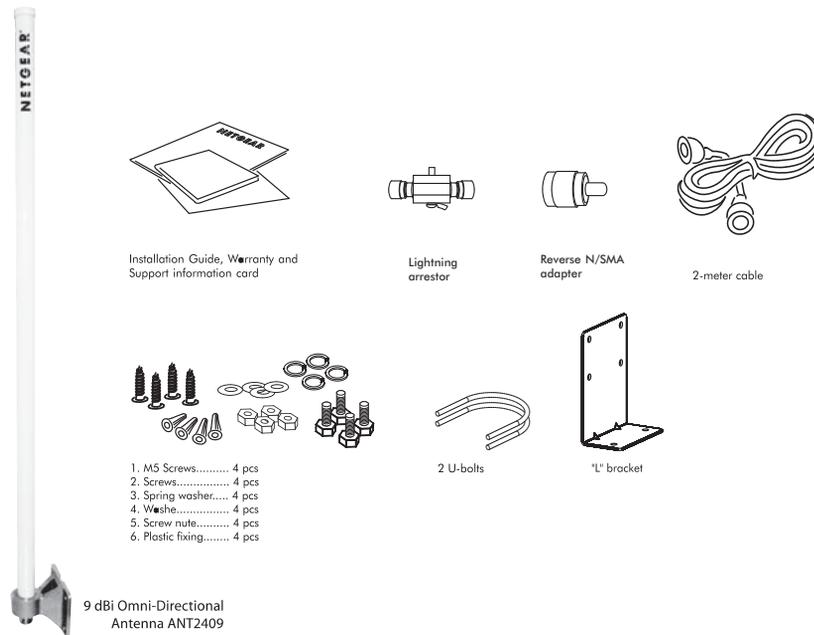


Figure 1-1

The package should contain the following items:

- NETGEAR 9 dBi Omni-directional Antenna
- 2-meter low loss antenna cable to connect the antenna to a lightning arrester

- Lightning Arrestor



Note: A ground cable is not included but required for outdoor installation. The grounding cable must be equivalent or better than: AWG 10, UL 1015, Stranded, 600 V, 105 °C, green or green/yellow insulation, 2 clip of 5.5 mm inner diameter cramped at both ends, cable no longer than 5 meters

- Reverse N/SMA Adapter
- Antenna mounting assembly (tube, grommet, 2 brackets, screws, washers)
- L shape bracket for top & ceiling mounting
- Screws, bolts, washers, U-bolts and plastic anchors
- This Installation Guide, and a Warranty and Support Information card

If any of the parts are incorrect, missing, or damaged, contact your NETGEAR dealer. Keep the carton, including the original packing materials, in case you need to return the product for repair.

To obtain optimal results in extending wireless range with antenna installations, consult a qualified professional installer for site survey and installation assistance.

Antenna cable for connecting the wireless device is sold separately. Please use a NETGEAR model ACC-10314-01, 02, 03, 04, or 05 cable.

In the U.S., the ANT2409 antenna should only be used with devices that have been FCC approved for use with it. Please check the NETGEAR website at http://www.NETGEAR.com/go/antennas_fcc for an updated list of FCC approved devices.

For Europe, use of any antenna requires careful planning and extra consideration to comply with EU emissions and health standards and regulations. Antenna installation must comply with the maximum level authorized by each country. Please check the NETGEAR website at http://www.NETGEAR.com/go/antennas_eu for a list of restrictions and approved devices.

Pole Mounting Configuration

The following illustration shows the pole mount configuration option.

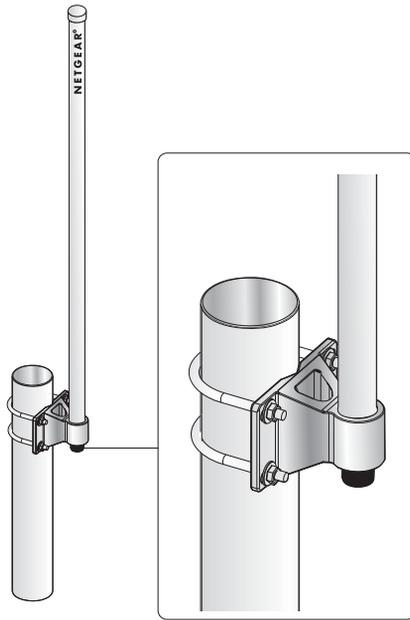


Figure 1-2

Flat Surface Mounting Configuration

This illustration shows a flat surface mount configuration.

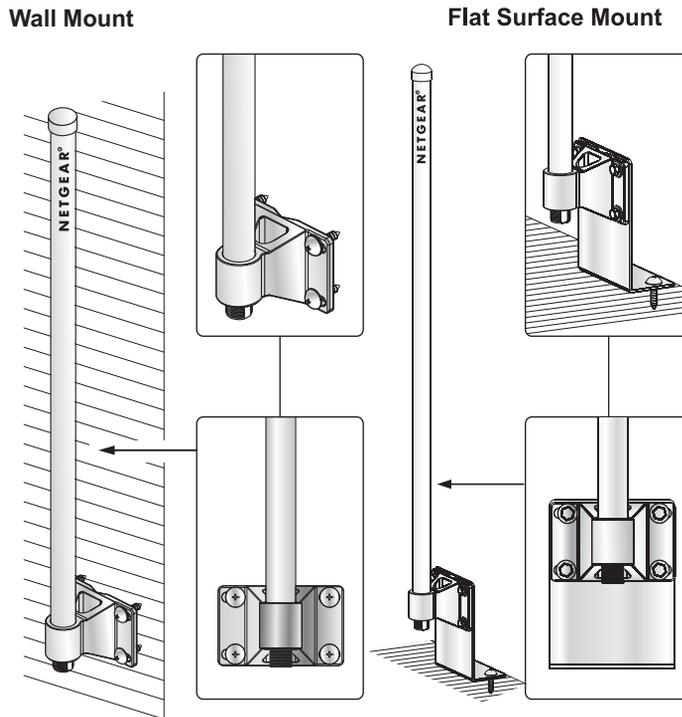


Figure 1-3

For wall mount installation, the L-bracket is not used.

Placement and Other Important Considerations

Before installing your wireless antenna, observe the placement considerations. Antenna placement dramatically affects potential coverage. Follow these guidelines to maximize coverage:

- Place the antenna in a vertical position. Either right side up or up-side-down is OK.
- Place the antenna in the middle of the coverage zone and at 1.5m or higher above the floor.

- Minimize obstructions around the antenna. Ideally there shall be a visual line of sight between the ANT2409 and the client antenna(s).
- **High ceiling:** place the ANT2409 in the center of the room installed up side down on a pole or on the ceiling with the L shape bracket.
- **Outdoors:** Place the ANT2409 on a roof fixed on a pole 2m above the roof level, or fixed directly on the roof near the edge, or against a wall, or on top of a telephone box. In most of the cases one ANT2409 is sufficient because the multipath fading is low or acceptable. However in cases where the building density is high, or narrow streets, or direct echo from another building, etc. two ANT2409 can improve the wireless performance (throughput and range). This latter is applicable only if the wireless device has two RF ports.
- **NOTE:** Ground cable is not provided but is required. Use AWG 10, UL 1015, Standard 600 V, 105°C, green or green/yellow insulation, 2 clips with a 5.5 mm inner diameter clamped at both ends, and cable no longer than 5 meters.
- **Indoors:** Place the ANT2409 above cubicle level, at the center of large room area preferred attached to the ceiling, a pole, or a column. Ideally, it should be located outside an IT data center or outside a room with multiple metal partitions. Use a NETGEAR antenna cable of up to 10 m length to connect the antenna to the wireless access point/router. In some situations one ANT2409 is sufficient because the multipath fading is low or acceptable and/or the client adapter wireless node provide spatial diversity. However in other cases where the multipath fading effect is medium to high two ANT2409 spaced by a few meters can improve the wireless performance (throughput and range). This latter is applicable only if the wireless device has two RF ports.

Indoor wireless propagation loss increases as follows:

- Wood building -- relatively little loss
 - Floors in concrete -- some loss
 - Reinforced concrete -- more loss
 - Metal floor or reinforced concrete with a lot of metal pipes, metal air conditioning channel, etc. -- most loss
- The best performance is achieved with a short cable between the antenna and the wireless device. The shortest approved cable to be used in conjunction with the ANT2409 in North America is the NETGEAR 1.5 m (ACC-10314-01) cable.
 - The antenna should be installed so that it is a minimum of 30 cm (12 inches) away from people.

Chapter 2

Installing the Wireless Antenna

There are two parts to the wireless antenna installation process:

- Assemble the wireless antenna for pole mount installation or flat surface mount installation.
- Connect the appropriate electrical hardware depending on if the installation is indoors or outdoors.

Follow the instructions in this section of the manual to install your antenna.

First, Assemble and Mount the Antenna

The antenna can be mounted vertically right-side-up or up-side-down.

1. Assemble the antenna as shown in the following illustration:

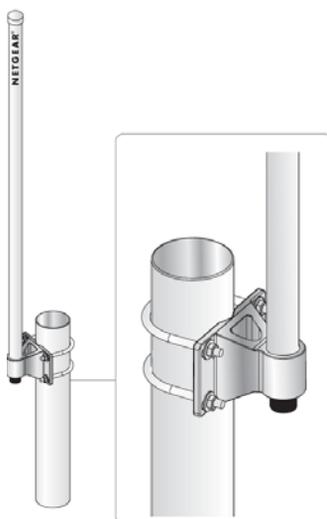


Figure 2-1

2. Securely attach the antenna cable. Make sure to use the correct cable.
 - **Outdoors.** Use the provided 2m antenna cable to connect to the lightning arrestor. A separate antenna must be purchased to connect the antenna to the access point.
 - **Indoors.** Use the provided N/SMA adapter with a NETGEAR cable model ACC-10314-01, 02, 03, 04 or 05 (sold separately) to connect the antenna to the access point. Do not use the provided 2m cable, which is only for connecting to lightning arrestor in outdoor installation.
3. Mount the antenna as shown in the following illustrations. The antenna can be pole mounted, wall mounted, or flat-surface mounted.

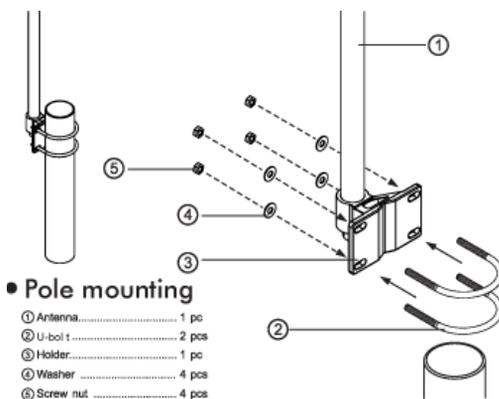


Figure 2-2

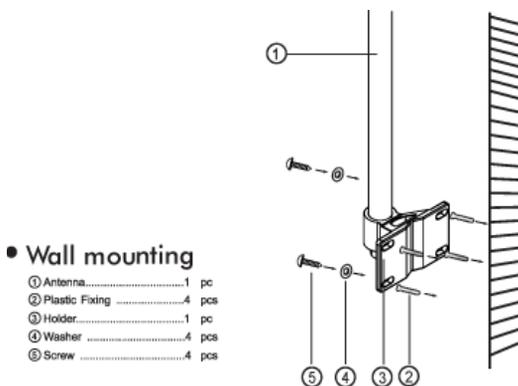


Figure 2-3

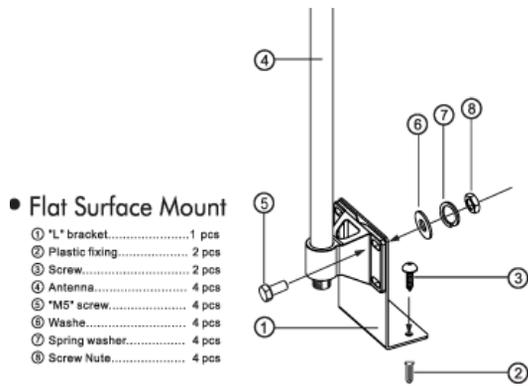


Figure 2-4

Now, Connect the Antenna

The instructions below cover outdoor and indoor installations.

Connecting the Antenna for and Outdoor Installation

1. Turn off your wireless unit.
2. In the procedure “Pole Mounting Configuration” on page 1-3, the antenna should have been assembled for outdoor installation using the provided 2-meter cable. Connect the other side of the cable to the lightning arrestor as shown here. You can connect the cable to either of the two RF ports on the lightning arrestor.

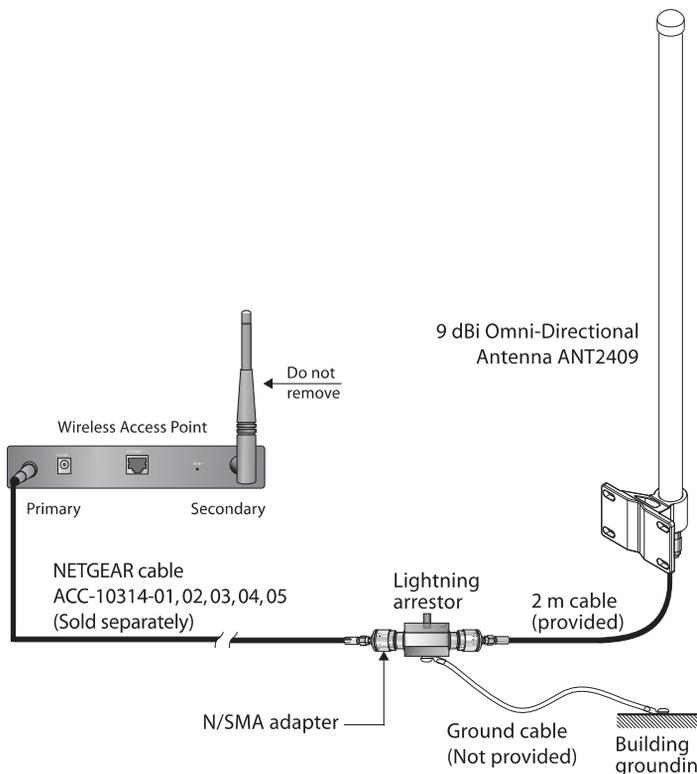


Figure 2-5

1. Connect the grounding cable (not included) from the lightning arrester to the ground of the building.

Grounding cable: The grounding cable must be equivalent or better than: AWG 10, UL 1015, Stranded, 600 V, 105 °C, green or green/yellow insulation, 2 clip of 5.5 mm inner diameter cramped at both ends, cable no longer than 5 meters.



Warning: The lightning arrester and appropriate ground cable must be used for outdoor installation. NETGEAR does not assume any responsibility in case of hazard resulting of non-compliance with these instructions.

2. Screw the N/SMA Reverse Adapter on the lightning arrester (clockwise) on the second RF port. Connect a NETGEAR cable model ACC-10314-01, 02, 03, 04 or 05 (sold separately) to the adapter.
3. Locate the primary detachable antenna on the wireless access point. Remove the antenna and connect the other end of the NETGEAR cable ACC-10314-01, 02, 03, 04 or 05 to this port.



Note: On access points with two antennas, if you are only replacing one antenna, be sure to replace the primary antenna and do not remove the secondary antenna

4. After attaching your new 9 dBi antenna(s), reconnect your wireless device to the network and turn them on.

Connecting the Antenna for an Indoor Installation

In the procedure “First, Assemble and Mount the Antenna” on page 2-1, the antenna should have been assembled for indoor installation using a NETGEAR cable ACC-10314-01, 02, 03, 04 or 05 and the reverse N/SMA adaptor connected to the antenna. The provided 2m cable *should not* have been used.

To connect the antenna:

1. Turn off your wireless unit.

2. Locate the primary detachable antenna. Remove the antenna and connect the other end of NETGEAR cable ACC-10314-01, 02, 03, 04 or 05 to this port.

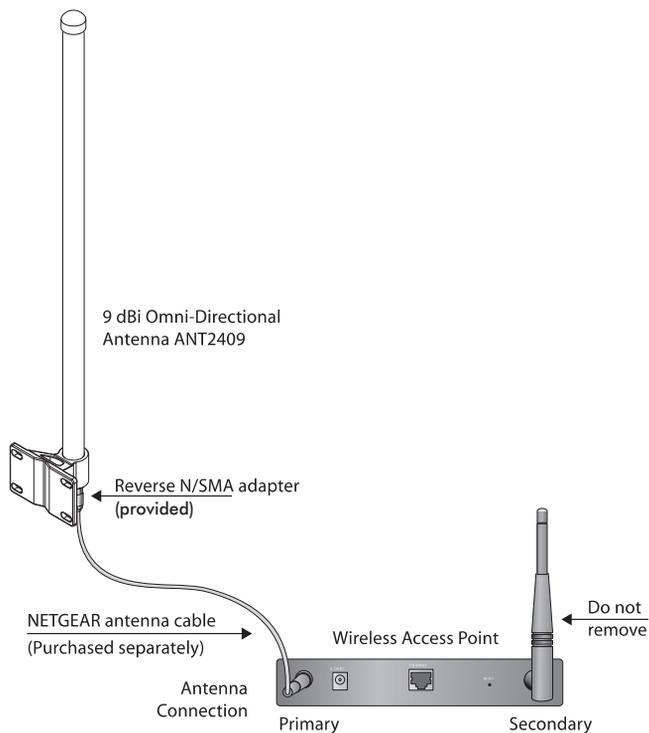


Figure 2-6

	<p>Note: On access points with two antennas, if you are only replacing one antenna, be sure to replace the primary antenna and do not remove the secondary antenna.</p>
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3. After attaching your new 9dBi antenna, reconnect your wireless device to the network and turn it on.

Chapter 3

Specifications

This chapter provides specifications.

Wireless Antenna and Mounting Assembly

The following table shows specifications for the antenna and mounting assembly.

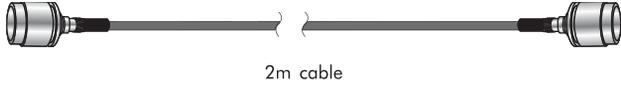
Table 3-1. Wireless Antenna and Mounting Assembly

Illustration	Usage	Outdoors and Indoors
	Frequency range	2400–2485 MHz
	Type	Omnidirectional
	Impedance	50 Ohms nominal
	VSWR	≤ 2.0
	Return loss	< –10 dB
	Gain	9 dBi
	Polarization	Vertical
	Connector type	N Jack Male
	Dimensions	21 mm (0.8 in) max. at antenna base Length: ~630 mm (25 in) max. for cabling with hardware
	Hardware included	2 U-bolds, 4 screws, 4 plastic fixings, 4 screw nuts, 4 washers
	Antenna color	White
	Antenna weight	0.2 kg (0.4 lbs)
	Rust proof	Hardware is rust proof.
	Water	Water resistant
UV	UV resistant	
Temperature, humidity	–30°C to +80 °C (–22 °F to 176 °F), 20 to 90% RH	

2 Meter Antenna Cable

The following table shows the specifications for the 2 meter antenna cable.

Table 3-2. 2 Meter Antenna Cable

Specifications	
 <p style="text-align: center;">2m cable</p>	
Frequency range	0–3 GHz
VSWR	1.5: 1 max.
Cable type	CFD200 (coaxial cable)
Transmission loss	1.5 dB max. @ 2.4–2.5 GHz
Connector type	N plug female* 2
Max. working voltage	250 Vrms min.
Minimum bend radius	25 mm (1 in)
Jacket	PVC
Recommended coupling nut torque	229 mm.kg* to 559 mm.kg* (4.1 in lbs to 10.0 in lbs)
Coupling nut retention force	2.5 kg* (5.5 lbs) min.
Connector body & contact	Brass Ni
Insulation	PE
Operating temperature/humidity	–30°C to 80°C (–22°F to 176°F)/ 20 to 90% RH
Transportation temperature/humidity	–40°C to 85°C (–40°F to 185°F)/ 20 to 90% RH
Storage temperature/humidity	–40°C to 85°C (–40°F to 185°F)/ 20 to 90% RH
Waterproof	Rain resistant
RoHS compliant	Yes
UV	UV resistant

N/SMA Adaptor Accessory

The following table shows the specifications for the N/SMA adapter accessory.

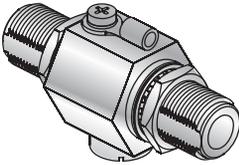
Table 3-3. 2 N/SMA Adapter Accessory

Illustration	Specifications		
	Frequency range	0–3 GHz	
	VSWR	1.5:1 max.	
	Connector type	N Plug female to SMA Jack Male	
	Insulation resistance	5000 MOhms	
	Center contact resistance	6 mOhms	
	Outer contact resistance	2 mOhms	
	Working voltage	500 V	
	Impedance	50 ± 5 Ohm	
	Body & center contacts	Brass	
	Insulation	PTFE	
	Gasket	Silicone Rubber	
	Storage & operating temperature	-30°C to +80°C (-22 °F to 176 °F)	
	Waterproof	Rain resistant	
	RoHS compliant	Yes	

Lightning Arrestor Specifications

The following table lists the specifications for the lightning arrestor.

Table 3-4. Lightning Arrestor

Illustration	Specifications	
	Frequency range	0–6 GHz
	VSWR	1.5:1 max.
	Insertion loss	1.3 dB Max
	Impulse breakdown voltage	110V min. (voltage on upgrade ration @500V/s)
	Max. power rating	200 W
	AC current range	20 A at voltage release =1S, testing period =5S, testing duration=3 min., per test
	Pulse current range	200 A (at 10/1000us, wave=300, testing duration=3 min., per test
	Impedence	50 Ohms
	Insulation resistance	1000 MOhms
	Max. withstanding current	5000 A, 8/20 μ
	Overvoltage protection	90V min. (100mA, < 150ms)
	Connectors	N Jack Male *2
	Color	Silver
	Operating temperature	–30°C to +80°C (–22 °F to 176 °F)
	Storage temperature	–40°C to 85°C (–40°F to 185°F)
	Waterproof	Rain resistant
RoHS compliant	Yes	

Radiation Patterns

The following illustration shows the radiation pattern for the elevation (vertical plane).

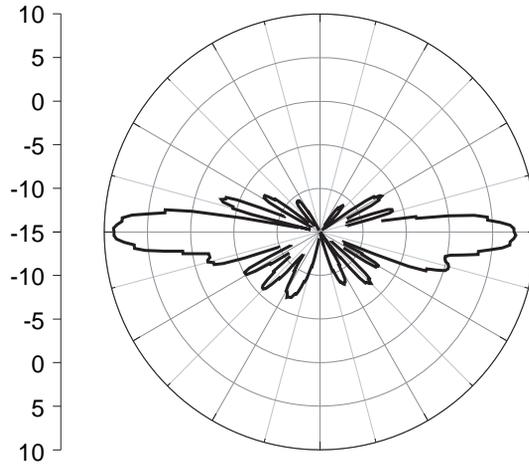


Figure 3-1

The following illustration shows the radiation pattern for the Azimuth (horizontal plane).

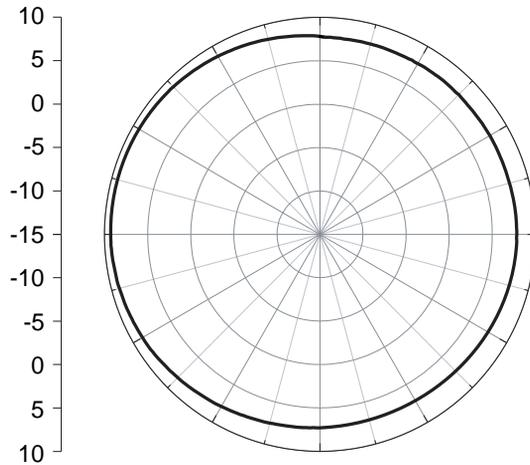


Figure 3-2

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